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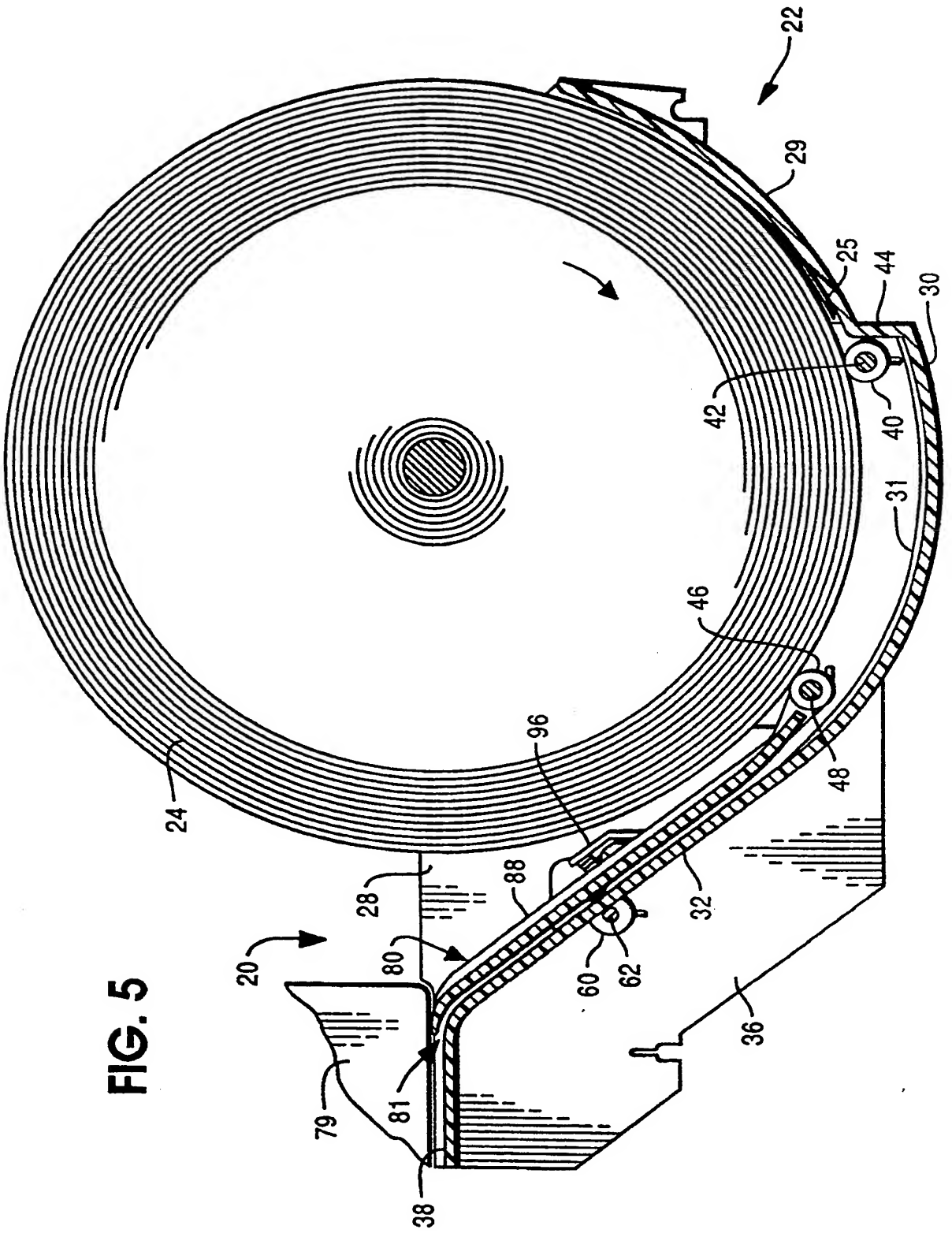
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㉙ **Paper feed apparatus.**

㉚ A paper feed apparatus (20) includes a receptacle (22) for a paper roll (24). The receptacle comprises a curved floor (30) and opposite side walls (26,28) which slope outwardly from bottom to top. The floor (30) has ribs (31) on its inner surface to minimize frictional engagement of a leader portion from the paper roll with said floor. Within the receptacle, the paper roll rests upon a guide roll (40) and a first feed roll (46) which is capable of rotating the paper roll to feed a paper web from the roll, over the curved floor (30) to a passageway (81). The passageway (81) guides the paper web to an exit portion of the passageway from where it may be introduced into a printer or other device. The passageway (81) is comprised of a portion (32) of the floor of the receptacle and a movable upper element (80). The movable upper element is pivotally mounted at one end on a shaft (48) associated with the first feed roll (46). A second feed roll (60) is positioned between ends of the passageway (81) to drive the paper web through the passageway, and cooperates with pressure rolls (100,102,104) mounted on the upper element of the passageway. A motor (58) is provided for driving the first and second feed rolls.

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This invention relates to paper feed apparatus.

Paper rolls are widely used to provide record media for receipts and other types of printed records generated by printers employed in business machines such as point-of-sale terminals. The traditional way of loading a printing mechanism paper roll is by inserting a supply core into the paper roll and then placing this assembly between two mounts which act as supports as well as providing guidance for the paper roll as record media is unwound therefrom. Following this, the paper leader is manually inserted into a guide chute or passageway until it contacts a feed roll-pressure roll combination. It is then fed to a printing mechanism by means of a motor and a drive train.

An object of the present invention is to provide an apparatus for feeding of paper from a paper roll in which the need for manual placement or insertion of a leader of a paper roll is eliminated.

According to the present invention there is provided apparatus for the automatic feeding of paper from a paper roll, characterized by receptacle means for receiving said paper roll, first and second roll means mounted in said receptacle means for engaging the periphery of, and supporting, said paper roll, guide means positioned between said first and second roll means, drive means for driving said first roll means whereby said first roll means brings about rotational movement of said paper roll within said receptacle so as to cause a leader portion of the paper forming said roll to be driven into a passageway for guiding paper unwound from said roll, said guide means serving to guide said leader portion into an entry portion of said passageway, and feed means arranged to engage paper from said roll within said passageway so as to drive said paper towards an exit portion of said passageway.

The present invention advantageously eliminates the need for manual intervention to feed the leader portion of the paper roll into the passageway.

An embodiment of the invention will now be described with reference to the accompanying drawings wherein:

Fig. 1 is a perspective view of the automatic paper feed guide apparatus of the present invention;
Fig. 2 is an elevation view of the apparatus of Fig. 1;

Fig. 3 is an end view of the apparatus of Fig. 1, taken along the line 3-3 of Fig. 2;

Fig. 4 is a plan view of the apparatus of Fig. 1, taken along the line 4-4 of Fig. 2;

Fig. 5 is a sectional view of the apparatus, taken along line 5-5 of Fig. 4;

Fig. 6 is a plan view of an upper portion of a passageway of the apparatus;

Fig. 7 is a sectional view of the upper portion of Fig. 6, taken along line 7-7;

Fig. 8 is a perspective view of the pressure roller

assembly of the upper portion of the passageway, and

Fig. 9 is a detail view showing a side wall of the receptacle and an associated flange.

Referring now particularly to Fig. 1, the automatic paper feed apparatus 20 shown there in perspective includes a receptacle 22 for receiving a paper roll 24. A leader portion of a paper web 25 from said roll 24 is fed incrementally to a printer (not shown) or other device for causing indicia to be printed thereon. Such a printer may typically be used in a business machine such as a point of sale terminal.

As may be seen in the various figures of drawing, the receptacle 22 includes a pair of side walls 26 and 28, and a floor 30 having a first downwardly-extending portion 29. The side walls slope outwardly from bottom to top and extend forwardly to an upwardly-turned portion 32 of the floor 30. As best shown in Figs. 3 and 9, extending forwardly from the portion 32 of the floor 30 are two parallel flanges 34 and 36 which are positioned inwardly of the side walls 26 and 28. A forward portion of the floor 30 forms a horizontal surface 38 above the flanges 34 and 36 which may be positioned adjacent to the printer. The floor 30 is provided along a portion of its inner surface with a plurality of ribs 31 to facilitate movement of the paper web 25 along said floor by reducing the frictional engagement therewith.

The paper roll 24 is partially supported in the receptacle 22 by a guide roll 40 which is mounted for rotation on a shaft 42 journaled in the side walls 26 and 28 and is located in a recessed portion of the floor 30 near a vertical wall portion 44 which is located at the end of the downwardly-extending portion 29. As best seen in Fig. 5, a feed roll 46 also supports the paper roll 24 and causes it to rotate in a clockwise direction, thereby unwinding the paper web 25 therefrom. The feed roll 46 is fixed on a shaft 48 which is journaled in the side walls 26 and 28. Also fixed on the shaft 48 is a gear 50 (Fig. 2) which is coupled via gears 52 and 54 to the shaft 56 of a motor 58 which thereby drives said feed roll 46. The motor 58 is fixed to the flange 34. An additional feed roll 60 (Fig. 5) feeds the web 25. Said roll 60 is fixed on a shaft 62 journaled in the flanges 34 and 36 and extends partially through an opening in the upwardly-turned portion 32 of the floor 30. A gear 64 (Fig. 2) is also fixed to the shaft 62 and is coupled through a mating gear 66 to the gear 54 which is fixed to the shaft 56 of the motor 58. The feed roll 60 is thus also driven by the motor 58.

Also shown in Fig. 2 are gears 66, 67, 68, 70, 72 and 74, all of which are mounted on shafts journaled in the flange 34. These gears are not part of the present invention. They form a gear train, along with gears 54, 66 and 64, which transmits driving movement from the motor 58 to a feed roll mechanism (not shown) in the printer which is associated with the apparatus 20.

Shown in Figs. 6, 7 and 8 is an upper guide element 80 which cooperates with the portion 32 of the floor 30 to form a guide chute or passageway 81 for guiding the paper web 25 from the paper roll 24 to the surface 38, from which it can be printed upon by the associated printer. At its lower end, the element 80 includes a pair of C-shaped members 82 and 84 which fit around the shaft 48 of the feed roll 46 and hold the element 80 in position at one end. The element 80 is of generally trapezoidal configuration to enable it to fit within the receptacle 22 which, it will be recalled, increases in width from bottom to top, and is slightly curved at the end adjacent to the members 82, 84 to provide a flared entrance to the passageway 81 to facilitate entry into said passageway by the paper web 25. A pair of reinforcing ribs 86 and 88 are provided to maintain the desired rigidity of the element 80. The element 80 is also provided with an opening 90, a pair of shaft retainers 92 and 94, and a support member 96 to accommodate a pressure roll assembly 98, shown in perspective in Fig. 8.

The assembly 98 includes three pressure rolls 100, 102 and 104 on an integral shaft 106. The shaft 106 is rotatably mounted in a pair of bearings 108 and 110 which form part of a pressure roll carrier 112 which also includes a pair of stub shafts 114 and 116 at its ends and a retainer 118 to which a spring 120 is attached at one end. The stub shafts 114 and 116 are pivotally mounted in the shaft retainers 92 and 94. The spring 120 is attached at its other end to a retainer 122 which is integral with the bottom side of the support member 96. The pressure rolls 100, 102 and 104 extend through the opening 90 and cooperate with the drive roll 60 to move the paper web 25 through the passageway formed by the wall portion 32 and the upper guide element 80.

Operation of the automatic paper feed apparatus of the present invention will now be described. When a new supply of paper for the printer associated with the apparatus is required, a new paper roll 24 is placed in the container 22, so that it rests upon the guide roll 40 and the feed roll 46. The end or leader of the paper web 25 is separated from the remainder of the roll 24 and is placed within the receptacle 22 adjacent to the inside surface of the downwardly-extending portion 29 of the floor 30 of said receptacle as may best be seen in Fig. 5.

The motor 58 is then caused to be operated by appropriate controls, which causes the feed rolls 46 and 60 to be rotated. Rotation of the feed roll 60 is without immediate effect, since the web 25 has not yet moved into the passageway 81 formed by the floor portion 32 and the upper guide element 80. Rotation of the feed roll 46 causes the paper roll 24 to rotate in a clockwise direction, which in turn causes the web 25 to be further separated from the paper roll 24 and to be extended over the guide roll 40 and guided into the portion of the floor (30) extending between the guide

roll 40 and the feed roll 46 into the passageway 81 formed by the floor portion 32 and the element 80. As the web 25 reaches the feed roll 60, it is further impelled by the feed roll 60 acting in cooperation with the pressure rolls 100, 102 and 104 of the pressure roll assembly 98.

It will be seen that the upper guide element 80 will be held in position by contact with a cooperating element 79 of the structure into which the paper feed apparatus is placed. The element 79 may be a journal module which is used to supply journal paper to the associated printer. The spring 120 tends to hold the pressure rolls 100, 102 and 104 in engagement with the feed roll 60, but yields to permit the paper web 25 to be moved therebetween, in response to the rotation of the feed roll 46. The paper web 25 is thus driven to the left, as viewed in Fig. 5, through the passageway and over the surface 38, from where it can be drawn into the associated printer and recorded upon.

While the form of the invention shown and described herein is admirably adapted to fulfill the objects primarily stated, it is to be understood that it is not intended to confine the invention to the form or embodiment disclosed herein, for it is susceptible of embodiment in various other forms within the scope of the appended claims.

Claims

1. Apparatus for the automatic feeding of paper from a paper roll (24), characterized by receptacle means (22) for receiving said paper roll, first and second roll means (46,40) mounted in said receptacle means for engaging the periphery of, and supporting, said paper roll, guide means (30) positioned between said first and second roll means (46,40), drive means (58) for driving said first roll means (46) whereby said first roll means brings about rotational movement of said paper roll within said receptacle so as to cause a leader portion of the paper forming said roll to be driven into a passageway (81) for guiding paper unwound from said roll, said guide means (30) serving to guide said leader portion into an entry portion of said passageway, and feed means (60) arranged to engage paper from said roll within said passageway so as to drive said paper towards an exit portion of said passageway.
2. Apparatus according to claim 1, characterized in that said guide means (30) is provided with a plurality of ribs (31) disposed in alignment with paper feed direction to facilitate movement of said paper over said guide means.
3. Apparatus according to claim 1 or claim 2, characterized in that said feed means (60) is a

feed roller arranged to extend into said passageway (81).

4. Apparatus according to claim 3, characterized in that said passageway (81) includes a guide element (80) having pressure roll means (98) mounted thereon, opposite said feed roller (60), extending into said passageway through an opening (90) in said guide element for cooperation with said feed roller (60).
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5. Apparatus according to claim 4, characterized in that said pressure roll means (98) is resiliently biased towards said feed roller (60).
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6. Apparatus according to any preceding claim, characterized in that said first roll means (46) is positioned adjacent said entry portion of said passageway (81).
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7. Apparatus according to any preceding claim, characterized in that said drive means (58) is a motor operatively coupled by a first gear train (50,52,54) for driving said first roll means (46).
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8. Apparatus according to claim 7, characterized in that said motor (58) is operatively coupled by a second gear train (54,66,64) for driving said feed means (60).
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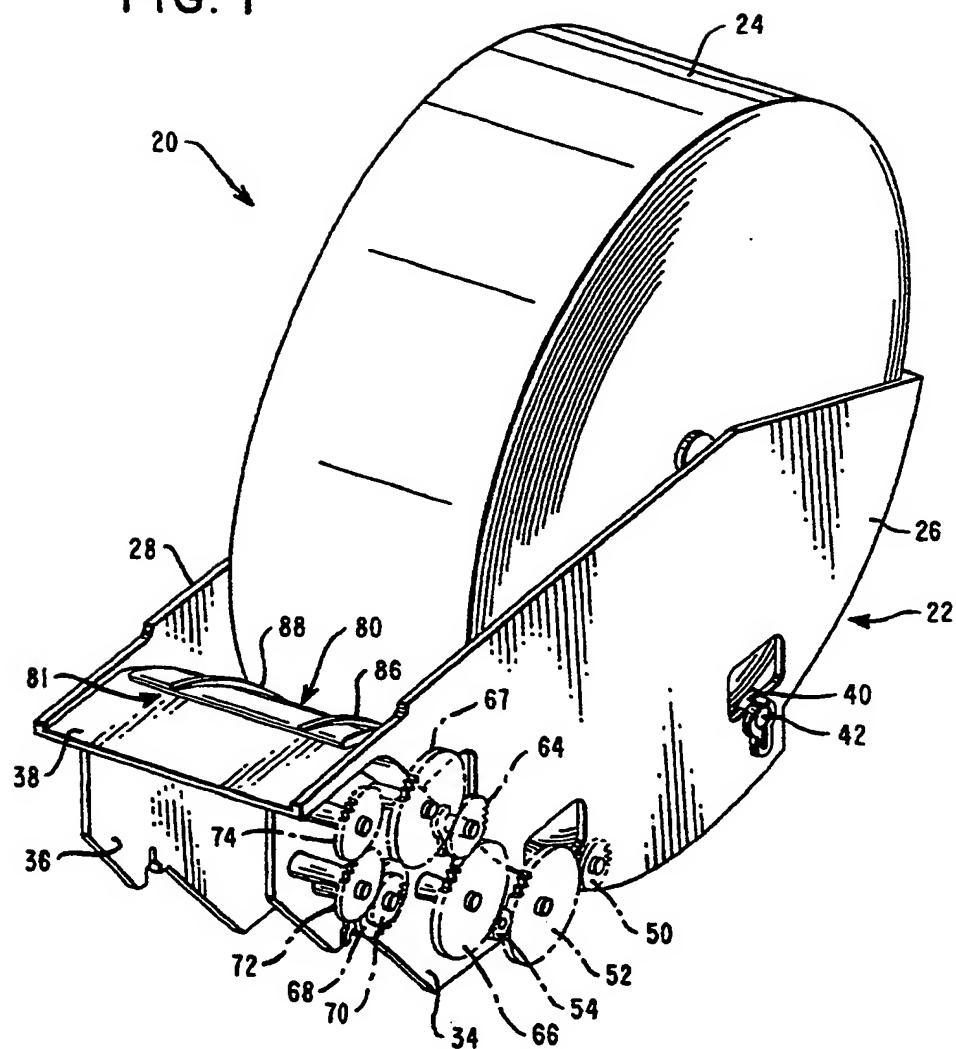
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FIG. 1



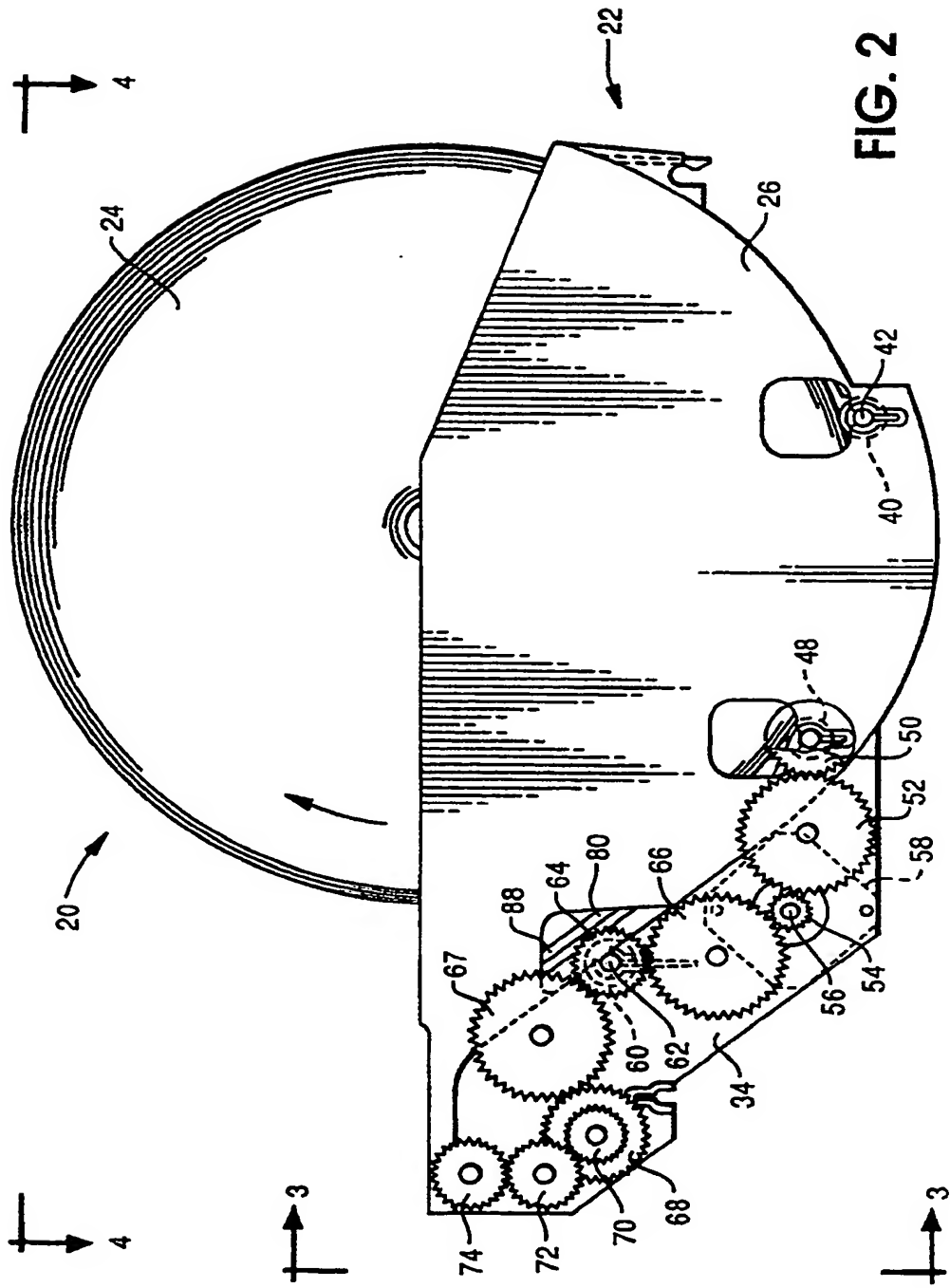


FIG. 3

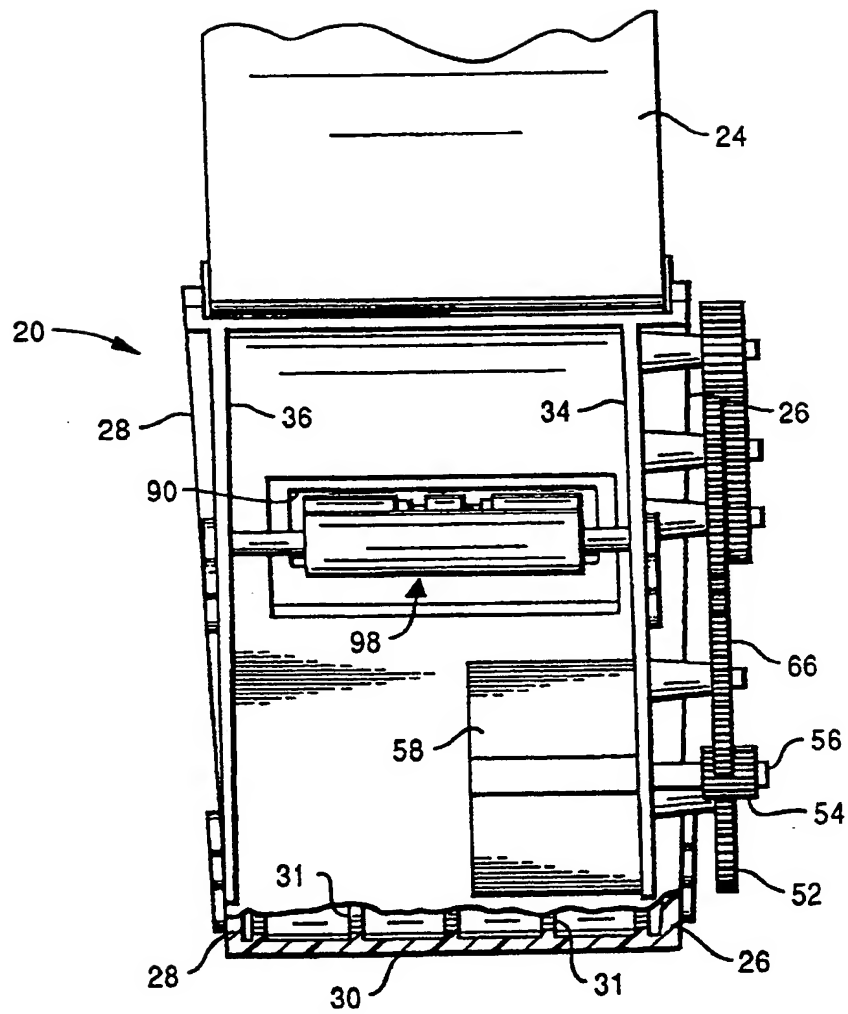
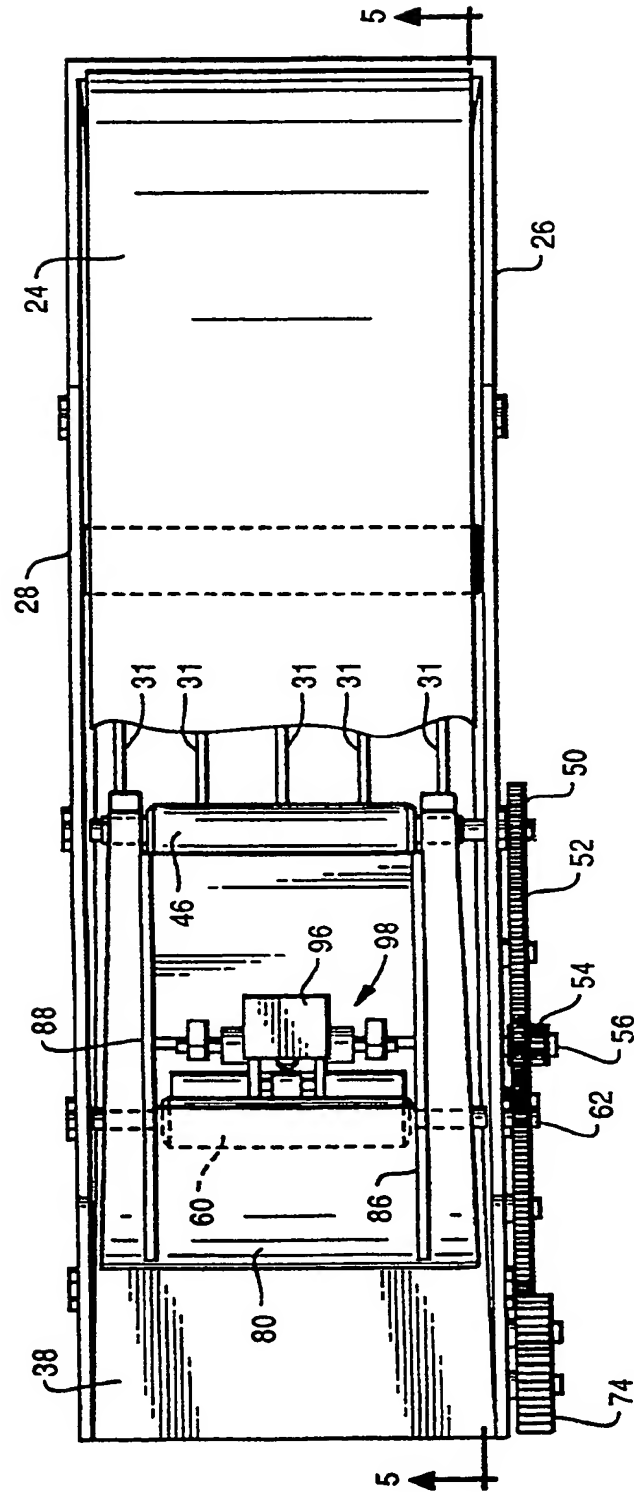
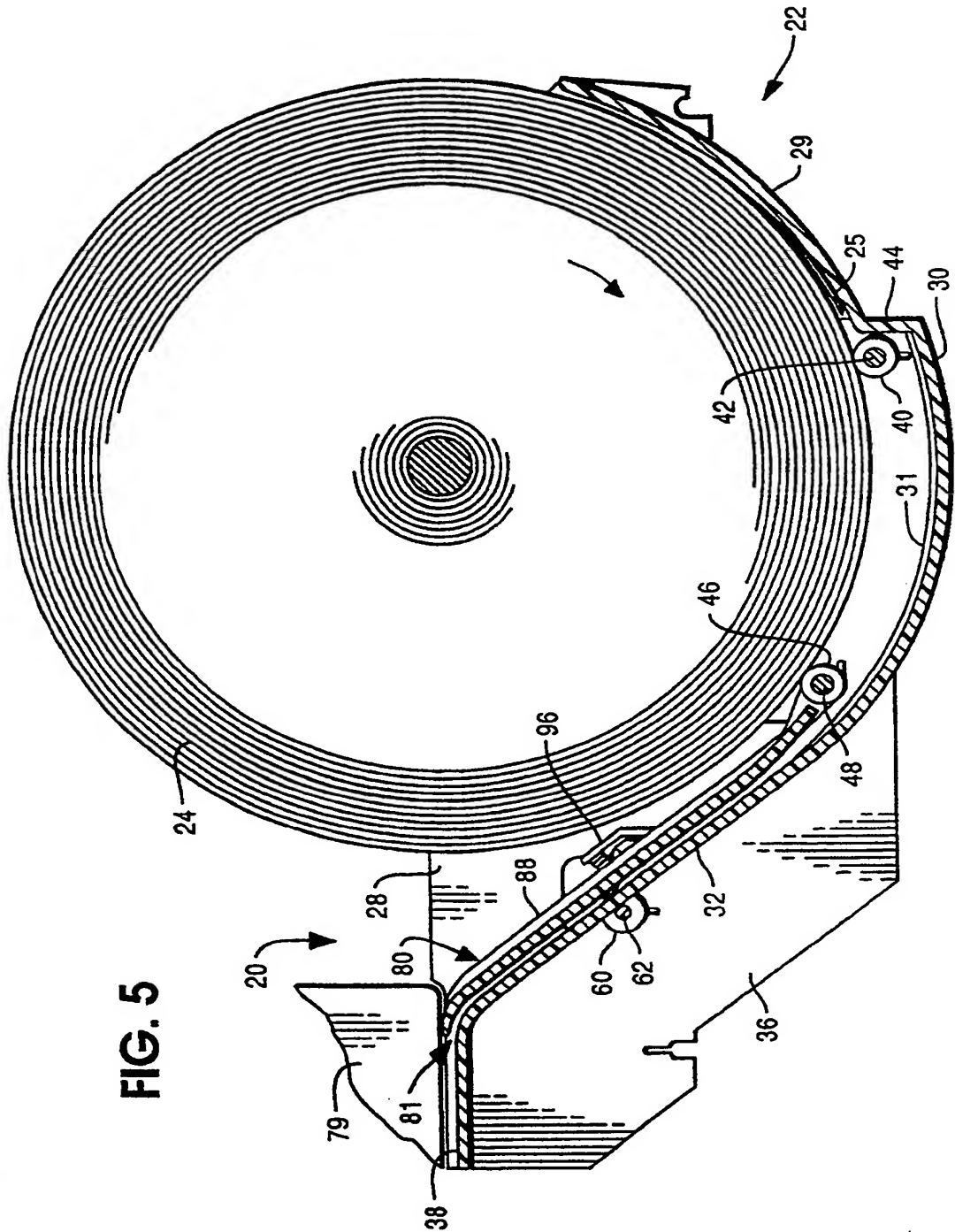


FIG. 4





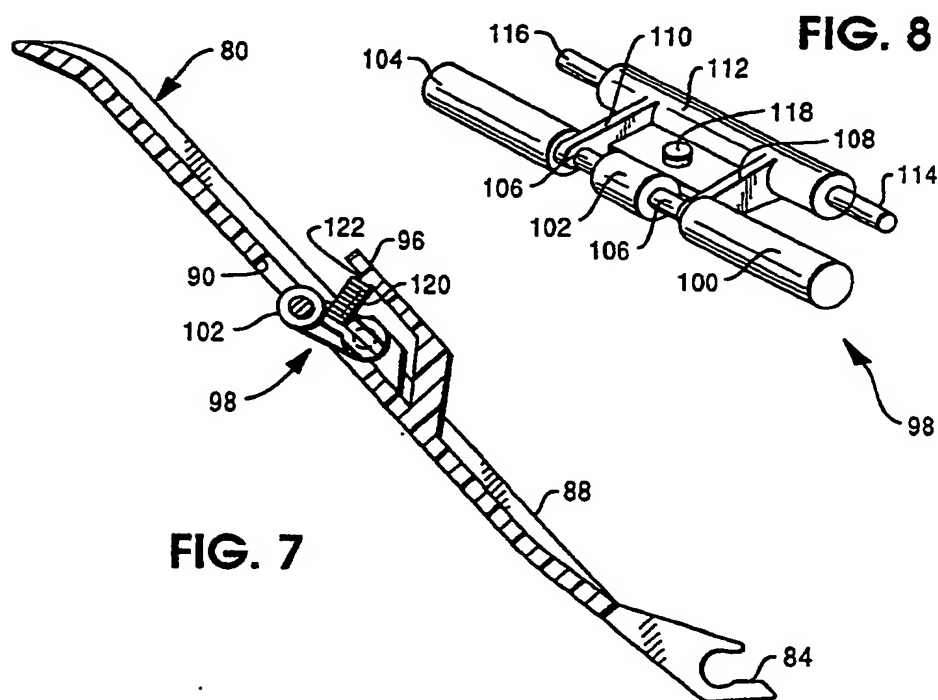
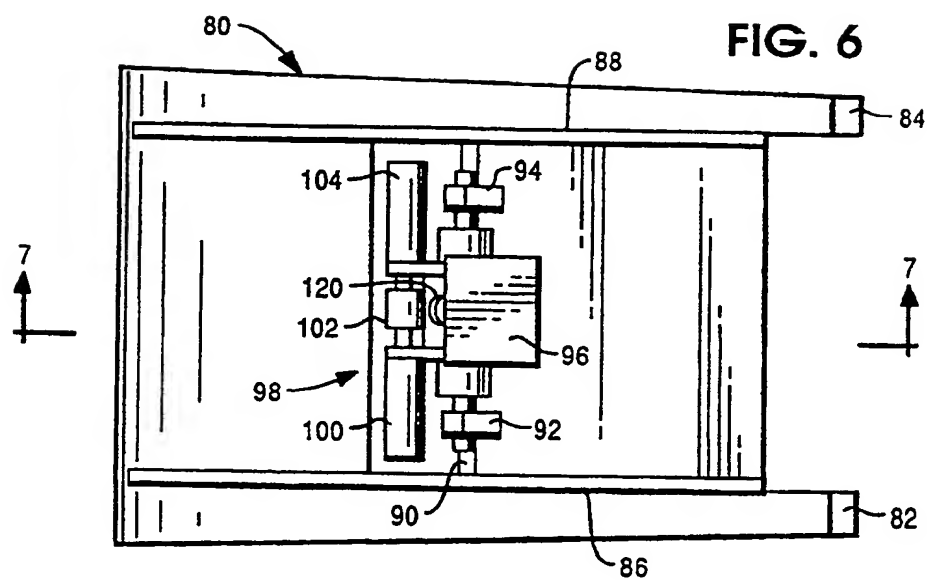
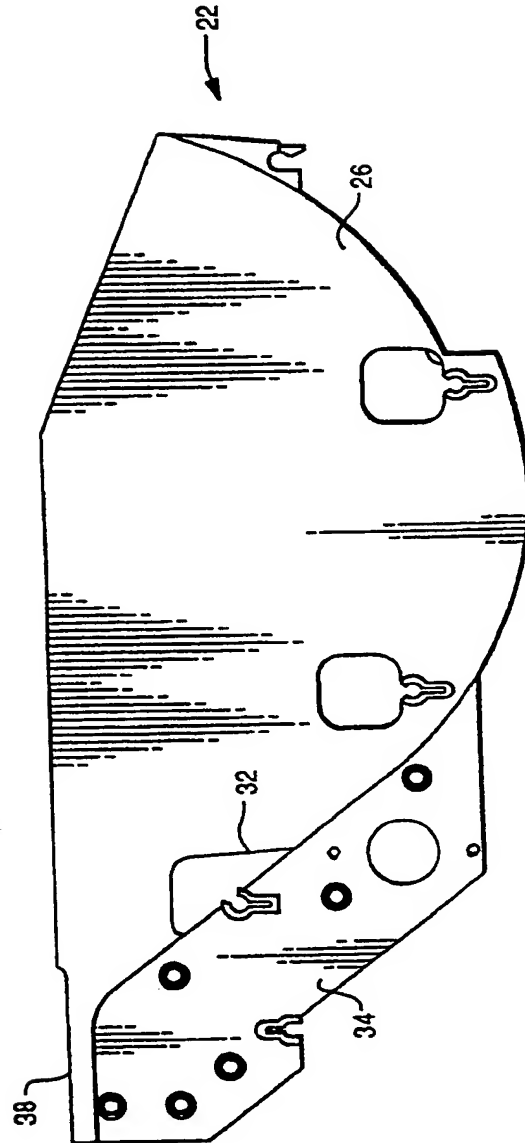


FIG. 9





European Patent
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EUROPEAN SEARCH REPORT

Application Number

EP 91 30 3210

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. 5)
X	PATENT ABSTRACTS OF JAPAN vol. 8, no. 116 (M-299)(1553), 30 May 1984; & JP - A - 59022840 (SANYO DENKI) 06.02.1984 ----	1, 3, 6-8	B 65 H 19/10 B 65 H 16/08 B 65 H 16/10 B 41 J 15/04
Y	idem ----	2	
Y	PATENT ABSTRACTS OF JAPAN vol. 10, no. 301 (M-525)(2357), 14 October 1986; & JP - A - 61114873 (TOKYO ELECTRIC) 02.06.1986 ----	2	
A	US-A-4 059 211 (BRIZZOLARA) * figure 1; column 3, line 60 - column 4, line 17 * ----	4, 5	
A	US-A-4 817 886 (YOSHIOKA et al.) * figure 4 * -----	4, 5	
			TECHNICAL FIELDS SEARCHED (Int. Cl. 5)
			B 41 J B 65 H G 07 G
The present search report has been drawn up for all claims			
Place of search BERLIN		Date of completion of the search 17-07-1991	Examiner FUCHS H.X.J.
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document</p>			

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